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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,544	08/28/2003	Robert Ralph Roediger	ROC920030011US1	8903

	7590	03/23/2006

IBM Corporation
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EXAMINER
DAS, CHAMELI

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)
Office Action Summary		10/650,544	ROEDIGER ET AL.
		Examiner	**Art Unit**
		CHAMELI C. DAS	2192

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>28 August 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-22</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,2,12 and 13</u> is/are rejected.

7)☒ Claim(s) <u>3-11 and 14-22</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>28 August 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All · b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>8/28/03</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED DESCRIPTION

1.   Claims 1-19 are pending.

Information Disclosure Statement

2.   The information disclosure statement (IDS) submitted on 8/28/03. The

submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the

information disclosure statement is being considered by the examiner.

Drawings

3.   The drawings filed on 8/28/03 have been accepted by the Examiner.

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

Claim 12 is rejected under 35U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

Claim 1 is not limited to tangible embodiments. In view of applicant's disclosure,

"the program product resides in a computer readable media" and "The present invention

contemplates **any media** upon which a program product may be stored or over which a

program product can be distributed" (specification on page 11, section [0048]). The

media is not limited to tangible embodiments, instead being defined as including both

tangible embodiments and intangible embodiments. As such, the claim is not limited to

statutory subject matter and is therefore non-statutory. The medium is not limited to

tangible embodiments, instead being defined as including both tangible embodiments

(e.g. computer readable medium) and intangible embodiments (e.g. carrier wave). As

such, the claim is not limited to statutory subject matter and is therefore non-statutory.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Benitez, et al (Benitez), US 6,189,141 and further in view of Wolf, US 6,567,976.

As per claim 1, Benitez (US 6,189,141) discloses:

- identifying partial hot trace using profile data (col 2 lines 36-50, col 9 lines 45-

   67, col 10 lines 1-5), the partial hot trace is shown in col 10 lines 1-2 ("the

   trace or a portion of it, is no longer frequently executed") clearly indicates the

   partial hot trace

- identifying an augmented hot trace set of instructions (col 9 lines 36-67),

   where "hot trace selector 204 selects a hot trace including such hot block. Hot

   trace selector 204 also includes in such hot trace those blocks related to such

   hot block that have arc counters greater than a trace-inclusion threshold. Hot

   trace optimizer and instrumenter 206 dynamically translates and optimizes

   hot traces" clearly indicates the augmented hot trace

- proper superset of the partial hot trace (col 9 lines 36-67 col 10 lines 1-11)

- comprising a proper subset of the entire loop (col 4 lines 37-56)

- which forms a complete loop iteration (col 32 lines 26-30)

- unrolling the augmented hot trace set of instructions (col 26 lines 27-55)

Benitez discloses optimize hot trace by unrolling the loop (col 32 lines 36).

Benitez does not specifically disclose without unrolling the entire loop. However,

Wolf discloses optimize the code by unrolling the entire loop (abstract, lines 1-8),

where unrolling only the outer loop clearly indicates that without unrolling the

entire loop and in (col 11 lines 24, col 13 lines 9-11), where "to produce an

unrolled section of code by unrolling a second two-deep loop" clearly indicates

that unrolling of the instructions can be performed without unrolling the entire

loop as claimed. The modification would be obvious because one of the ordinary

skill in the art would be motivated to reduce the total number of load and store

operation for efficient optimization of the execution.

For claim 2, (Benitez, col 9 lines 35-67, col 10 lines 1-10).

Claim 12 is the program product claim of corresponding method claim 1 and

rejected for the same reason set forth in connection of the rejection of claim 1 above.

Claim 13 is the program product claim of corresponding method claim 2 and

rejected for the same reason set forth in connection of the rejection of claim 2 above.

Allowable Subject Matter

6.   Claims 3 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reason for allowance: The cited prior art taken alone or in combination fail to teach in combination with the other claimed limitations, a method for identifying a candidate augmentation path set of instructions having more than one trace through candidate augmentation path set of instructions, and more than one of the traces having similar probabilities of being executed during an iteration of the loop, the sum of the probabilities of the one or more traces through the set being similar to the probability of execution of the partial hot trace, as recited in the dependent claims 3 and 14.

Claims 4-11 are allowed because they are depended on claim 3.

Similarly, *claims 15-22* are allowed because these claims are depended on claim 14.

Conclusion

7.   The prior art made or record and not relied upon is considered pertinent to applicant's disclosure.

TITLE: Compiler apparatus and method for <u>optimizing loops</u> in a computer program, US 6938249 B2
TITLE: Profile instrumentation method and profile data collection method, US 5950003
TITLE: Optimizing compiler with static prediction of branch probability, branch frequency and function frequency, US 5655122 A

TITLE: Method of performing a compilation process for determining a branch probability and an apparatus for performing the compilation process, US 5742803 A

TITLE: Compile method for reducing cache conflict, US 5862385 A

TITLE: Method and system for generating compact code for the loop unrolling transformation, US 6035125 A

TITLE: Method and system for optimizing code, US 5901318 A

TITLE: Method, apparatus, and system to optimize frequently, US 6964043 B2

TITLE: Insertion of prefetch instructions into computer program code, US 6675374 B2

TITLE: Method, apparatus, and product for optimizing compiler with rotating register assignment to modulo scheduled code in SSA form, US 6651247 B1

TITLE: Software profiler which has the ability to display performance data on a computer screen, US 6311324 B1

TITLE: Dynamic Hot data stream prefetching for general-purpose program, author: Chilimbi et al, ACM, June 2002.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chameli Das whose telephone number is 571-272-3696.

The examiner can normally be reached on Monday-Friday from 7:00 A.M. to 3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Tuan Dam can be reached at 571-272-3695. The fax number for this group is (571) 273-8300.

An inquiry of general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is 571-272-2100.

CHAMELI C. DAS
PRIMARY EXAMINER

3/16/06